SCIENCE.—SUPPLEMENT.

FRIDAY, NOVEMBER 6, 1885.

RECENT PROGRESS IN POLITICAL ECONOMY.

It has long been evident to close observers of current thought and discussion that the so-called science of political economy is in a state of transition. The old authorities have begun to lose their hold on general regard and esteem. Ricardo, Malthus, and Mill no longer hold the pre-eminent position once accorded to them. Until within a few years of Mill's death, the statement might have been truthfully made that nearly every prominent thinker in the field of economics in England, France, and Germany, was an adherent of the so-called orthodox school of political economy. Economics was regarded as one of the most exact and severe of sciences, and as having reached a most advanced stage of its development.

The reaction began in Germany early in the fifties by the rise of the historical school, and increased so rapidly that German thought was soon completely emancipated from the domination of English authority in this field. The movement was slower in England; but it had made such progress before Mill's death, that even Mill himself had begun to be influenced by it, and was convinced that many of his views were untenable. He openly confessed his conviction that one of his fundamental doctrines, that of the wage-fund theory, was false, and adopted a very different theorem in its place.

So steady and general was the defection in the ranks of the orthodox, and so vigorous were the attacks on the stronghold of the faithful, that the public soon lost all confidence in the scientific character of political economy. This was strikingly manifested, a few years ago, when a movement was started in the British association for the advancement of science, to abolish the economic section of that body on the ground that there was no such thing as a science of political economy. This movement was met, on that occasion, by the memorable address of Professor Ingram, which revealed, for the first time, how completely the later thinkers had broken with the old views. The growing influence of the writings of such men as Cliffe Leslie shows how ripe the time is for a new start in this field, while the recent publication of the work of the lamented Toynbee indicates the existence of a school of thinkers in the very centre of Oxford and Cambridge, who are in hearty sympathy with the new movement.

The same tendency to break away from the old moorings is plainly seen among the younger men in this country. It is to be clearly discerned in the tone of newspaper writing done by those who have come under the influence of this new movement. It is evident at all the centres of learning where the modern scientific spirit has been allowed access to this field. It came plainly to light in the organization of the new American economic association formed at Saratoga in September last, where it was clear that the men interested in the enterprise believe that political economy is still in a rudimentary state, and that, if it is ever to attain to the rank of a universally acknowledged science, it must leave the purely abstract and *a priori* methods of the early economists, and have recourse to the same general methods of investigation which have achieved so much in modern natural science.

Perhaps the most striking evidence, however, of the untenableness of the old system, and the imperative necessity for a new, is to be found, not in the attacks of the opponents of 'orthodoxy' in the economic field, but in the present attitude of its defenders. For a time they took almost no notice of the defection from their ranks, or of the growing numbers of their opponents, or, if they did notice it, it was done in that supercilious way which is universally characteristic of conscious infallibility. But a great change has come over the spirit of their dreams. They are now finally aroused, and the result of their awakening is to be found in a series of attempts 'to restate the fundamental doctrines of the science in a less objectionable form.' As a matter of fact, when they get the doctrines fairly 'restated, so as to correspond more closely to the actual conditions of our modern industrial life,' the restatement is so different from the original theory that the latter is scarcely any longer to be recognized in it.

This is eminently true of the little work by Mr. Bagehot.[1] The author examines in the two essays of which the book consists, and which were originally published in the *Fortnightly review*, two of the postulates of the English orthodox school of economics, with the idea of restating them with such modifications as he thought they needed in

[1] *The postulates of English political economy.* By Walter Bagehot. New York, *Putnam*, 1885. 8°.

order to bring them into harmony with the facts of modern society. The postulates selected are those referring to the transferability of labor and capital respectively.

After a short discussion of the reasons for the general neglect into which English political economy has of late fallen, in which he gives nearly all reasons except the right one, viz., that it is an outlived theory, the author proceeds to show that the Ricardian assumption of the easy and rapid transferability of labor and capital among various industries never has been true, and is not true now, though it may be true in the distant future. A more complete vindication of the justice of the attacks on Ricardo's system, so far as it is claimed to be a satisfactory explanation of our modern industrial economy, could scarcely be desired. Had Mr. Bagehot lived to finish the great work of which these essays were to form a part, it can scarcely be doubted that he would have followed out his premises to their legitimate conclusions, and finally have been found where he belonged,— among the opponents, instead of among the restaters, of 'orthodoxy.'

C. R.

TEMPERATURE OF THE MOON'S SURFACE.

Professor Langley's two most important discoveries — 1°, that the greater part of the energy in the solar spectrum is way below the visible red; and, 2°, that our atmosphere is more and more transparent to radiant energy the greater its wavelength — promise to bear fruit in many directions. In his paper on the temperature of the surface of the moon,[1] one of their applications is shown in the complete upsetting of the long-cherished idea that the temperature of the moon's surface rises to 200° or 300° F. during the lunar day, and falls about as far below zero in the lunar night. First enunciated as a theory by Sir John Herschel, the only experimental evidence upon which it has rested has been the observations of lunar radiation by the present Earl of Rosse, to which Professor Langley takes no exception, so far as the experimental results are concerned, but from their interpretation by Lord Rosse, he entirely dissents. This interpretation rests upon the assumptions, 1°, that solar radiation is principally confined to luminous vibrations; 2°, that about 92 per cent of these are transmitted by glass; and, 3°, that only 1.6 per cent of the obscure rays are transmitted by glass. The first has already been shown to be entirely wrong, and, when it is remembered that Professor Langley found over two-thirds of the total energy in the solar spectrum, from a glass prism, to lie below the visible red, nothing further need be said as to the non-conclusiveness of any deductions from the above assumptions.

Professor Langley's observations on Mt. Whitney lead him to the conclusion that, were it not for our atmosphere, the surface of the earth, even under continuous direct sunshine, would be at a temperature of only about 48° C. above that of surrounding space (whatever that may be), at any rate low enough to freeze every thing up solid, perhaps even the gases; and he concludes that the moon is in this condition unless it has an appreciably absorbing atmosphere, of which there are only some uncertain suggestions at present.

Attacking the problem entirely anew, he speaks of its importance as follows: —

"The amount of heat received from the moon, and the dependent question as to the temperature of the lunar surface, are subjects of greater interest to us than might at first appear. They are even ones in which we may be said to have a material concern, for, until we know the temperature which an airless planet would attain in the sun's rays, we can have no accurate knowledge of the extent to which the atmosphere of our own planet contributes to its heat, nor of some of the most important conditions of our own existence."

Professor Langley describes important improvements in the galvanometer used with his bolometer, so that with the combination of the two he is now able, when the needle is damped to a period of 10ˢ., to make 1ᵐᵐ. on the scale correspond to a current of only 0.000,000,001,3 of an ampère, or indicate a difference of temperature of only 0°.000,016 C. As regards precision of measurement, the probable error of a single observation is only about 2 per cent of the total amount of lunar radiation, while in Lord Rosse's work the probable error of *the mean of a series of* 10 *observations* was 19 per cent, thus giving one of the former a weight equal to several hundred of the latter, to say nothing of its far greater freedom from constant errors.

With this apparatus, and with all the other refinements and precautions against error which invariably accompany all of Professor Langley's work, he has been making the following investigations: —

1°. Direct measurement of lunar heat compared with solar. 2°. Comparison of moon's heat with that of Leslie cube (hot water). 3°. Transmission of lunar heat by the earth's atmosphere. 4°. Comparative transmission of glass for lunar and

[1] Memoirs of the National academy of sciences, vol. iii. pt. i, 2d memoir. On the temperature of the surface of the moon. By S. P. Langley. Washington, *Government*, 1885. 4°.

solar heat. 5°. Observations during a lunar eclipse. 6°. Formation of a lunar heat spectrum.

We can only summarize the results, and they are best given in his own words: "While we have found abundant evidence of heat from the moon, every method we have tried, or that has been tried by others, for determining the character of this heat, appears to us inconclusive; and, without questioning that the moon radiates heat earthward from its soil, we have not yet found any experimental means of discriminating with such certainty between this and the reflected heat that it is not open to misinterpretation. Whether we do so or not in the future will probably depend on our ability to measure by some process which will inform us directly of the wave-lengths of the heat observed."

Were this all, it would be a somewhat discouraging ending, but the best and most important part is a note added February, 1885, which we quote in full:—

"Since the above paragraph was written, we have succeeded in obtaining measures with rock-salt prisms and lenses in a lunar heat spectrum. These difficult measures must be repeated at many lunations before complete results can be obtained; but, considering their importance to the present subject, we think it best to state now in general terms, and with the reserve due to the necessity of future experiment, that they indicate two maxima in the heat curve,—one corresponding within the limits of errors of observation to the solar curve maximum; the second, indefinitely lower down in the spectrum, corresponding to a greater amount of heat at a lower temperature. Exactly what temperature this latter corresponds to, we have no present means of knowing. We have succeeded, however, in forming a measurable heat spectrum from the surface of a Leslie cube containing boiling water, and the maximum ordinate in the lunar heat curve appears to be below the maximum ordinate in the hot water curve. The inference from this is, of course, that the temperature of the lunar soil is, at any rate, below that of boiling water, and in an indefinite degree.

"We cannot close this note without calling attention to the remarkable fact that we here seem to have radiations from the moon of lower wave-length than from the sun, which implies an apparent contradiction to the almost universally accepted belief that the sun's emanations, like those from any heated solid body, include all low wave-lengths representing temperatures inferior to those certainly emitted."

Further comment is unnecessary. The novelty and importance of the above is self-evident.

H. M. PAUL.

ILLUSTRATIONS OF RECENT ITALIAN PSYCHOLOGY.

THE science of psychology is still somewhat in the position of the young man who has just passed his twenty-first birthday. While really entitled to all the rights and dignities belonging to any of the citizens of the republic of science, yet these privileges are accorded with somewhat of a reluctant spirit especially on the part of the older citizens, who seem rather startled at the notion of receiving, on terms of equality, so very youthful and so very presumptuous a candidate. But now that special professorships in this department have been instituted at several of our universities and colleges; now that the questions which it discusses find a hearing before appropriate sections of the great scientific associations (for it is scientific psychology alone that is meant); that special societies and journals are devoted to the encouragement of its progress; it may fairly be presumed that whatever of a protest to this reception still makes itself heard is only the echo of by-gone days.

While the greatest part of our experimental knowledge of mind is undoubtedly due to German writers and workers, France and Italy have also contributed much to raise the science to its present position. In France the *Revue philosophique*, of which M. Ribot, whose psychological works are well known to English readers, is the editor, pays special attention to the strictly scientific side of its domain. There has been founded, too, a society of physiological psychology, especially devoted to the consideration of experimental topics. In Italy the *Rivista sperimentale di freniatria*, edited by M. A. Tamburini, and the *Archivio di psichiatria*, etc., edited by M. Cæsare Lombroso, devote much of their energies to another side of the subject. Both the writers just mentioned are deeply interested in the psychology of the criminal and other classes of defectives. The voluminous work of M. Lombroso (Uomo delinquente) is a standard in this line of research. The *Revue philosophique* for September enlarges the circle of readers of some of these researches, by presenting a summary of articles from the two Italian journals. In the hope of still further increasing the usefulness of these contributions to psychology, some account of them is given here.

M. Ferri has made a special study of the religious sentiment in the criminal class, and intends to publish a volume on this subject. He found, in a very large number of criminals examined, only a single one who did not believe in the existence of a God, and most of them belonged to the established church. Many of them are de-

voted to religion, tattooing themselves with religious symbols, asking for God's aid in their enterprises, and thoroughly sincere in their belief that confession absolves them from all responsibility. They are very superstitious; several were found who believed that they expiated their crime by dipping their fingers in the blood of the victim and sucking them, or by wearing the same shirt for a year.

A very excellent example of the connection between the various forms of mental and moral imbecility is shown in the case of a certain Salvatore Misdea, a soldier, whose crime was one of a peculiarly savage nature. He had a prejudice against all Italians who did not come from his own province of Calabria, and imagined that a certain officer had selected his fellow-countryman for punishment just because the latter was a Calabrian. He attacks the corporal, but another soldier, Cordara, interferes. He threatens to chop Cordara's head off that night, but soon everything is calm again. Suddenly a shot is heard and a soldier falls. Misdea enters with a gun, and fires into the crowd right and left. Many try to escape, but he pursues them, and kills the corporal and five or six other soldiers before the gun is wrested from his hands. In prison he was carefully examined by M. Lombroso and Bianchi. They find him to be a crafty, suspicious fellow, with a good deal of pride in his criminal powers. His head was deformed and asymmetrical; the forehead low and poorly shaped, narrow in the temporal region and large above. The right half of the head is more developed than the left; the reverse being the normal condition. Besides, he has epileptic tendencies. His family presents a line of abnormal persons, whose abnormality shows itself in insanity, idiocy, criminality, and general looseness of character. (1.) His grandfather was weak-minded. (2.) Of four uncles, two were imbeciles, a third eccentric, and a fourth killed a friend in a broil; while Misdea's father wasted a fortune on drink, women, and gambling, and his mother was an hysterical woman, who had one brother a brigand and another a sneak-thief. (3.) Of four cousins, two were imbeciles, a third idiotic, and the other insane. (4.) Of four brothers, one was healthy; two were drunkards, one at the same time epileptic; and the other was a violent character. (5.) A nephew also showed bad traits. In spite of all the evidence pointing to his irresponsibility he was condemned to be shot.

This case strongly reminds one of the celebrated criminal family of the 'Jukes' in New York state. There, too, the members of this monstrous family were not all afflicted with the same kind of disease, but weak-mindedness, pauperism, obscenity, thievishness, and burglarism showed themselves in different branches of the family. This inter-relation of moral and mental insanity, especially in their hereditary forms, has recently been attracting much attention. Dr. Maudsley has noted the great prevalence of moral failings in epileptics and imbeciles. Kraft-Ebbing, a German alienist, corroborates these observations; and M. Lombroso has now attempted to describe some bodily peculiarities common to many of these defective classes. He finds that in moral insanity as in epilepsy the stature and weight are often 13 per cent superior to the normal mean. There is generally, too, an asymmetry of the cranium and other parts. So, too, in face characteristics, epileptics show certain peculiarities which are also found in persons defective from birth. The ears are rounded, the cheek-bones prominent, the forehead wrinkled, the beard wanting, the jawbones exaggerated, the face asymmetrical, the forehead low and with a hunted expression among the men. Most of these characteristics are evident in the women as well, who frequently have a masculine expression. Obtuse sensibility and eye troubles are common among them. But the chief points of contact will always be their psychology, and for this one must consult the larger works of Lombroso and others.

The study of the bodily or anthropometric peculiarities of these defective classes is getting to be a very favorite line of work. Quite an original contribution to this subject is the attempt of Messrs. Lombroso and Cougnet to detect the effect of different states of the emotion on the pulse beat. They took the tracing of the sphygmograph in sad and gay moods. They excited the amorous passion, or showed a piece of gold, or a glass of wine, or paid the person a high compliment. The sexual passion and the glass of wine modified the course of the pulse, the money did so still more, and vanity the most. In short, criminals are a very vain class of beings.

The question of bodily asymmetry has been frequently referred to, and is generally recognized as an important symptom not only in the head measurement, but also in all the properties common to the two sides of the body. M. Lombroso has recently measured the local sensibility[1] of the skin on the two sides of the body in the sane, insane, blind, and deaf mutes. In normal persons the sensibility on the right side is 6 per cent better than on the left. In 100 persons there is an equal sensibility on the two sides in 44; left

[1] This was done in the usual manner. A pair of compass points are applied to a definite region and moved so far apart until the subject can just discriminate that two points are applied (and not one).

superior, 26; right superior, 29. In criminals, however, the left side is 11 per cent more sensitive than the right; and their sensibility is only 88 per cent of the normal; *i. e.* their sensibility is more obtuse, and the normal relations on the two sides are reversed. In 100 criminals the sensibility is equal bi-laterally in 54; left superior in 27; right superior, 18. One hundred and four insane patients were examined, 43 per cent of whom were more sensitive on the right, 33 per cent on the left side, and 24 per cent were equally sensitive on the two sides. As left-sidedness of this kind becomes more frequent, the difference between the two sides of the body becomes greater. This phenomenon the author calls 'laterality,' and recognizes as a true pathological symptom. In the blind, as in normal people, the right side is the more sensitive, and is as much as 13.5 per cent superior to the left. But their absolute sensibility is 96 per cent of the normal,[1] *i.e.*, slightly less than that of seeing persons. The male blind are more sensitive on the left side, the females on the right. Their 'laterality' and prevalence of left-sidedness allies them to abnormal classes. In deaf mutes the left sensibility is 15.5 per cent better than the right, and their absolute sensibility is like that of the blind, 4 per cent inferior to the normal. Left-sidedness, too, is prevalent.

J. J.

COMPOSITION OF THE WHEAT GRAIN.

THE various grades of wheat flour differ from each other, chiefly as regards the admixture of the outer coats of the grain and of the germ found in the pulverized endosperm which constitutes the bulk of the flour. The problem which M. Girard in his recent book[2] proposed to himself was to separate the grain, not into flour and bran, but into the several tissues of which the microscope shows it to be composed, to determine the proportion of each contained in the grain, to analyze each, and, finally, to determine from these and other data the alimentary value of each tissue and the advisability of allowing it to enter into the finished flour. By very ingenious methods, and the expenditure of much time and patience, he was able to separate, first, the coats of the grain from the endosperm, and, second, the several tissues of the seed coats from each other. The results of this laborious investigation are very interesting, and enable us to form a much more accurate notion of the quantitative distribution of nitrogenous matters, ash, woody fibre and fat among these tissues than was possible before. At the same time it cannot be said that, aside from this, they constitute any very material addition to our knowledge. They show that the 'aleurone layer' is rich in nitrogenous matters, and contains very nearly all of the nutritive substances found in the seed coats, but this was well enough known before.

Of more general interest are his investigations of the nutritive value of the several seed coats, and of their influence upon the quality of bread; but here, unfortunately, a prejudice becomes apparent which detracts seriously from the value of the investigations. The author entitles this section of his book 'Experiments upon the *non-digestibility* by man of the envelope of the wheat grain' (the italics are ours), and he allows this prepossession to lead him into some serious errors in interpreting his results. His digestion experiment (but one was made) was executed upon himself, and, according to his interpretation, showed that but an insignificant proportion of the total dry matter or of the proteine of the envelope was digested. Before the experiment, however, he extracted his materials with water. The amount of matter thus extracted is stated, but it is not counted as digestible, as it evidently should be, because, as the author himself says, "it is evident that they (the extracted matters) would be dissolved in the digestive apparatus."

Correcting this error, and also a gross error in the method of calculation employed for the proteine, we find that there was really digested 22.8 per cent of the dry matter and 35 per cent of the proteine of the envelope, or that it contained 22.8 per cent of total digestible matter, including 6.5 per cent of digestible proteine. Girard's figures are 6.77 per cent of total digestible matter and 0.73 per cent of digestible proteine!

Rubner, in some recent investigations[1] obtained still higher figures, viz., 31.3 per cent of the dry matter, 61.1 per cent of the proteine, and 26.6 per cent of the non-nitrogenous matters; but his figures were obtained by a rather complicated calculation, and refer rather to commercial bran than to the clean seed coats of Girard's experiments. There is no sort of doubt that a not inconsiderable proportion of the seed coats is digestible by man, but, as Girard emphasizes, when calculated upon the whole grain the proportion thus utilized is small, while the quality of the bread is impaired. This is particularly the case with raised bread. According to Mège-Mouriès

[1] This conclusion is contrary to the prevailing opinion. Moreover, the careful experiments of Czermak on blind boys showed very clearly that their sensibility was better than that of seeing persons. It should also be noted that the left side is frequently referred to as the more sensitive.

[2] *Composition chimique et valeur alimentaire des diverses parties du grain de froment.* Par M. AIMÉ GIRARD. Paris, *Gauthier-Villars*, 1884. 67 p., 3 pl. 8°.

[1] Jahresbericht über thier-chemie, xiii. 384.

(quoted by Girard), the envelope contains a soluble ferment resembling diastase, which, during the raising process, at the same time converts starch into sugar and diminishes the elasticity of the gluten, thereby tending to make the bread heavy, while it also imparts a brown color to the bread. Bread made with baking-powder would naturally escape these effects to a large extent.

It is certain that wholesome, palatable bread can be made from whole wheat flour, and, for dietetic reasons, many may prefer it. From an economic point of view, however, it can hardly claim any great advantages, so long as nearly every one can command a mixed diet, and the bran can be profitably utilized as cattle food.

THE ENGLISH SPARROW.

The question of the policy to be pursued toward this bird is fast becoming one of importance; and in many parts of the country stringent measures of extermination are urged by the indignant citizens. A committee of the American ornithologists' union recommended as the result of their inquiries,—

1°. That sheltering or otherwise fostering the sparrow by the public be discouraged, and that its introduction artificially into new localities, and its sale for such purposes, be forbidden by law.

2°. That all existing laws protecting the sparrow be repealed, and that bounties be offered for its destruction.

The states at present protecting this species are Maine, New Hampshire, Vermont, Rhode Island, New York, New Jersey, and Ohio. There are also protective laws in the District of Columbia and Canada. The Massachusetts law has been repealed and specially exempts the English sparrow from protection. The protective law has also been repealed in Michigan.

The earliest known date of importation of the bird is 1858, when Mr. Thomas A. Deblois liberated a few in Portland, Me. These disappeared shortly afterward, and were not successfully replaced until 1875. In 1858 sparrows were liberated at Peacedale, R.I., by Mr. Joseph P. Hazard. They were first introduced into Central park, New York city, in the year 1860. In 1864 twelve birds were turned loose in Madison square, New York city. In 1868 the species was first introduced into Boston common; in 1869, in the parks of Philadelphia; and a little later it became resident at Indianapolis, Ind. In a period of about ten years the sparrows spread through New England and the middle states, and many of the western states, without artificial assistance. In the southern and the western states, beyond the Mississippi River, the bird has not been observed. In Canada it has become generally distributed over the southern sections of Quebec and Ontario, and in 1884 several flocks invaded New Brunswick.

The bird is evidently spreading itself with extreme rapidity, which should be expected from a bird that hatches from three to four broods of four each in a single season.

In regard to the food of the sparrow, little seems to be settled except that it prefers vegetable food to animal, but will eat insects if driven to it. It is capable of doing great injury to grain, and is a great pest to fruit-raisers. I have seen flocks of them in cherry-trees doing far more mischief than the robin, and I have seen them in early spring nip off the young buds of peach-trees without any apparent reason, other than a desire not to be idle. Seeing that they did not appear to eat the buds, I killed two to see their reason for this destruction. I found nothing in their stomachs except crumbs that had been fed them that morning.

The bird has little to recommend it, is noisy, dirty, and disagreeable both to man and to other birds; and there is every reason why we should do in this country as it has been found necessary to do in others,— enact laws looking to their extermination.

Ralph S. Tarr.

THE EFFECT OF THE SETTLEMENT OF NORTH AMERICA UPON ITS WILD ANIMALS.[1]

The common deer was abundant from Florida to Canada, throughout the eastern half of the United States, when Europeans first settled in this part of North America. It is now restricted to the sparsely-settled forested portions of this area, and is rapidly decreasing in numbers. The 'elk,' or wapite, ranged throughout temperate North America as far east as the Blue Ridge. For many years it has been wholly extirpated east of the Great Plains and in the Rocky Mountains, and in the far west generally is rapidly approaching extinction. The moose and the caribou have been driven northward in New England and southern Canada to still unsettled forest regions; while the bison, formerly ranging in considerable herds eastward to the Alleghanies, and occupying the Great Plains in countless numbers, is now practically extirpated; a few small bands, remotely scattered, and numbering a few dozen individuals each, constituting the insignificant remnant of the millions that, less than twenty years ago, covered the Plains, from Texas to the Saskatchewan. The pronghorn and

[1] Condensed from an article by Ernest Ingersoll, in Bull. Amer. geogr. soc., 1885, No. 1.

the black-tailed deer have suffered great restriction in area of habitat, and have greatly decreased in numbers. The mountain sheep and mountain goat, delighting in the rocky fastnesses of alpine summits, well-nigh inaccessible to man, still bid defiance to human foes, although the former has been driven from much of its former range. At the present rate of destruction, only a remnant will soon remain of any of the ruminant tribe, even in the comparatively unsettled west, though formerly they overspread the greater part of the continent.

The larger carnivorous mammals—as the bears, the wolf, the coyote, the lynxes, and the panther, formerly so abundant throughout the parts of the country they respectively inhabited as to be at its first settlement obnoxious, and a serious detriment to the farmer and stock-raiser—are now practically exterminated east of the Rocky Mountains, and thence westward are rare in comparison to their former abundance. This is especially true of the wolves, the coyotes, and the panthers; the bears and the lynxes still maintain a foothold in the partially wilderness areas of the east.

The fur-bearing animals—as, notably, the beaver (formerly a nearly universal occupant of the continent), the otter, the sable, and the mink—have greatly decreased in numbers, all but the latter having been long nearly extirpated throughout all the more settled portions of the east. The sable, a northern species, never ranged over a very large part of the United States, but the others were spread southward to the Gulf. The squirrels, at times a scourge to the frontier farmer through their abundance, linger still in small numbers; while the smaller vermin of the fields have doubtless suffered but slight decrease in numbers.

The birds are variously affected, in accordance with their food and haunts. The larger forest-haunting species—as the birds of prey, the woodpeckers, and some of the grouse—have followed the forests in their downfall; the turkey, the prairie-hen, and the aquatic game birds—as the ducks, geese, and a great variety of shore birds—have in places been extirpated, and, in general, are few in comparison to their numbers a century ago. The song-birds have doubtless held their own, and in not a few instances have certainly increased; the agricultural development of the country being, on the whole, favorable to their welfare, although they suffer at the hands of nest-robbing boys, and children of larger growth anxious to kill something, however slender the pretext. The graceful terns, or 'sea-swallows,' and the herons, especially the beautifully-plumed egrets, have fallen a prey to fashion and the 'hat trade' to such an extent, that where, fifty years ago, the terns fairly swarmed along our Atlantic coast, they are now mainly conspicuous by their absence.

Batrachian and reptilian life has also greatly diminished; the former through the draining of ponds and marshes in the reclamation of waste lands, the latter through the almost universal inborn hatred of snakes.

The depletion of our inland streams and lakes and the larger rivers, of fish, is simply notorious, extending even to the marine species that enter the rivers merely to spawn. Nor has marine life fared better, as witness the decline of the lobster fisheries, the actual and very early extirpation of the oyster along our northern coasts, and the exhaustion of once famous clam-flats.

Much of this destruction of animal life was simply inevitable, since wild large game cannot exist in a densely-populated district. But extirpation has been in many cases needlessly hastened, as witness the preservation of deer by legislative enactments, in regions where they would otherwise have long since ceased to exist. The course of the pioneer has ever been marked by slaughter of animal life, too often recklessly, even for the mere sport of killing, and not merely from necessity or with utilitarian intent. Hundreds of thousands, probably millions, of bisons have been killed merely for their hides, and at seasons when they were nearly worthless, and their carcasses left to rot where they fell, and many thousands more merely for the sport of slaughter; while the different species of the deer tribe have suffered similarly, in less degree, consequent only upon their smaller numbers and greater difficulty of capture.

ADMIRAL BARON FERDINAND VON WRANGELL.

FERDINAND VON WRANGELL was born near Werro in Liefland, December 29, 1794. His early years were passed on his ancestral estate, where his education in manly sports and the schooling of his time was carried on by a family tutor. At the age of ten he lost his parents, who died within a few months of one another. He entered not long afterward the school of naval cadets at St. Petersburg, with his cousin Wilhelm, and was graduated in 1815 with the highest honors. He was appointed to the post of Reval, where he was associated with his cousin and von Anjou, an intimate friend, later his companion in Siberian travel. Hearing that a Russian vessel was to sail for a voyage around the world in command of Captain Golofnin in 1815, he secured an appointment and formed one of the party on the naval sloop Kamchatka, which included the young and

afterward celebrated Lûtké. The vessel sailed for Russian-America in 1817, and completed her voyage in two years, when he was promoted to a lieutenancy, after which, through the influence of Golofnin, he was appointed leader of the expedition for the exploration of the east Siberian coast and the lands believed to lie to the north from it. For this journey, which has become classical, he prepared himself by special study at Dorpat and St. Petersburg. He went out in 1820 and returned to St. Petersburg in 1824. In 1825 he took the brig Krotky on a voyage to Sitka and return, after which he was appointed to the command of a frigate, and in 1829 to be governor of the Russian colonies in America. He married the Baroness Elisabeth Rossillon, and the young pair started for his new post by the overland route across the whole breadth of Siberia. The journey, severe at the present day, was an extraordinary one for that time, and took a year and a half, during which time a daughter was born to them. Arrived at his post, Wrangell distinguished himself by the reforms he introduced into the colonial administration, and the wealth of scientific material which he gathered for students of geography and ethnology. They returned via Mexico and the United States in 1836. He was made a director of the Russian-American company, and advanced in the government to the post of director of naval construction and conservator of the imperial forests. In 1852 he lost his faithful wife. During the Crimean war he was made director of the hydrographic department, and in 1862 retired from active service. His life thereafter was passed in the bosom of his family, either in his old home or in Italy, where he remained several years. He was made associate of the Institute of France as successor to De Candolle, and his latter days were passed in the study of art, science, and the promotion of the Lutheran communion, of which he was a devoted member. On the 25th of May, 1870, he died, his friend Lûtké surviving him eleven years. His services to science do not need to be recounted, his character was pure and elevated, and his executive ability remarkable. The sketch of his useful and honorable life[1] from which the above facts have been gathered, has been prepared as an introduction to a new edition of his 'Journey to the polar sea,' by his daughter, Lisa von Engelhardt. This publication, indispensable to all students of arctic matters, contains an excellent portrait and a new map of the region explored. It is well printed in Roman type, but contains no index. We note as a singularity that, notwithstanding Baron Wrangell expressly authorized his associates, Baer and Helmersen, to print his name with the final consonant doubled, in this publication it is found without the final *l*.

[1] *Ferdinand von Wrangel und seine reise längs der nordküste von Sibirien und auf dem eismeere.* Von L. v. Engelhardt. Leipzig, *Duncker & Humblot*, 1885.

A SEARCH FOR THE GIGANTIC BIRD OF MADAGASCAR.

Grandidier has communicated to the Academy of sciences an interesting account of his search for remains of the gigantic bird of Madagascar, the Æpyornis, supposed to be the original from which the fabled roc of the 'Arabian nights' was derived. The hope that the bird itself might still survive, according to Grandidier, is without foundation. A vast area of the interior south of Lat. 20° S., heretofore hardly visited, now proves to be an arid plateau with sparse desert vegetation, suitable perhaps for ostrich-like birds, but where they could hardly exist without being observed even by the scanty population of these wastes. These natives have neither knowledge nor traditions of any such creature, according to our author. Remains, chiefly of the eggs, have hitherto been found only between Cape St. Marie and Machikora on the southern coast, at Mananzari, Port Leven and St. Marie Island. The coast is bordered by immense sand dunes, only a few yards from the sea, which are constantly advancing in a southwesterly direction. The complete eggs have been found only where rain, flooding the ravines, has suddenly washed away large quantities of sand. It is probable that the bird covered its eggs in the warm sand like an ostrich, and that those found whole are such as failed to hatch. They are naturally rare, but fragments of the egg-shell are not uncommon and occur chiefly where the sand is sifted by the wind. On the dry plateau none were found. With the pieces of egg-shell, were found several species of Bulimus, Helix and Cyclostoma, one of which, Bulimus favanneus Fér., still retains part of its color marks, and is found living in some parts of Madagascar at the present day. The dunes appear to be formed largely of shell sand mixed with grains of quartz, and occasional concretionary balls of lime. The traveller was not fortunate enough to find any bones. He thinks the Æpyornis, like the moa of New Zealand, though now entirely extinct, eixsted during the present era, but was probably exterminated very soon after the advent of man in the region it inhabited.

— Mr. Latchford of Ottawa recently discovered at Quebec, Helix cantiana Montague, hitherto unrecorded from America. It is doubtless an importation, but was abundant under the south wall of the citadel, showing that, like many other immigrants, it has found a congenial home.